TA-1080

INTEGRATED STEREO AMPLIFIER

Specifications (1)

System : All Silicon Transistor integrated stereo amplifier

Circuit : Quasi-complementary symmetry SEPP OTL circuit
30 transistors, 21 diodes

Transistor : 2SC401 (15) 2SC293 (3) 2SC297 (1) 2SC299 (5) 2SD45 (4) 2SA527 (2)

Diode : FR-1U (4) DS2M (2) 1T206 (10) SV6 (4) 2SF-103 (SCR) (1)

Power requirement : AC 100, 117, 220, 240V. 50/60 Hz

Power consumption : Approx 25W at zero signal
Approx. 200W at maximum output

Dimensions : 400(W)×145(H)×310 mm(D) (15¾×5¾×12¼")

Weight : Approx. 11 kgs. (24 lbs.)

SONY®

SERVICE MANUAL

Specifications (2)

Power output: Non-clip music power 100W both channels (8 ohms)
Music power (IHFM) 90W both channels (8 ohms)
Rated output 30W per channel (8 ohms)
27W per channel (16 ohms)

Harmonic distortion: Less than 0.15% at rated output (less than 0.1% in power amplifier section)
(IHFM) Less than 0.1% at 500mW output(less than 0.05% in power amplifier section)

Intermodulation distortion: Less than 0.4% at rated output, 70 Hz : 7 KHz=4 : 1
(SMPTE)

Frequency response: Power amplifier
15 Hz~100 KHz $^{+0}_{-1}$ db at rated output
Tuner, Aux, Tape
30 Hz~100 KHz $^{+0}_{-2}$ db (twin-T low-cut filter below 30Hz)
Phono-1, Phono-2
30 Hz~15,000 Hz ±0.5 db (RIAA)
Tape head
30 Hz~15,000 Hz ±0.5 db (NAB)

Damping factor: More than 40 at 8 ohm load

Residual noise: Less than 0.05μW at 8 ohm load

S/N ratio: Aux, Tuner (closed circuit) more than 80 db
(IHFM) Phono-1 (〃) morn than 70 db
Phono-2 (〃) more than 70 db
Tape head (〃) more than 60 db

Inputs: Tape head (NAB, 19cms), Phono-1 (RIAA)
Phono-2 (RIAA), Tuner, Aux, Tape

Outputs: Rec out (output level 120mV), Speaker out

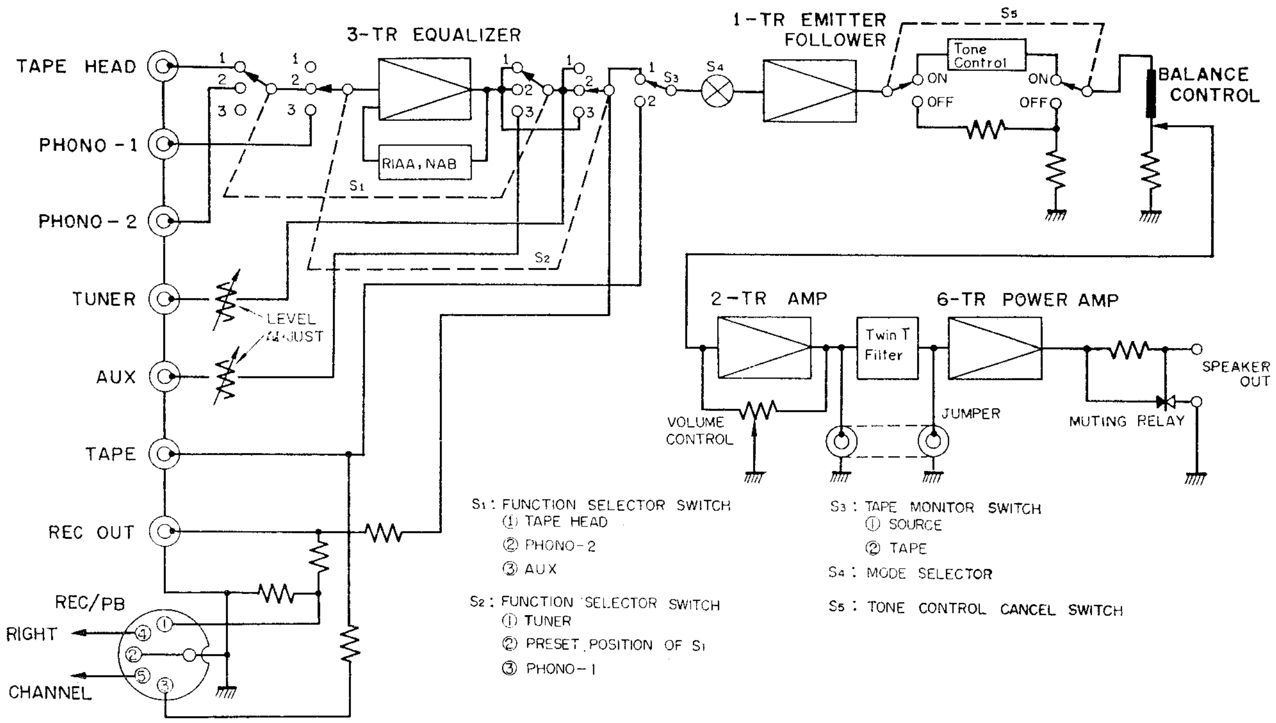
Integrated record/playback Input level 500mV
Connector: Output level 12mV

Input sensitivity: Tape head 0.7mV, Impedance: more than 100k ohms at 1 KHz
more than 200k ohms at 10 KHz
Phono-1, Phono-2 2.3mV, Impedance: approx. 47k ohms
Tuner, Aux 120mV (adjustable). Impedance: more than 100k ohms
Tape 120mV, Impedance: more than 100k ohms

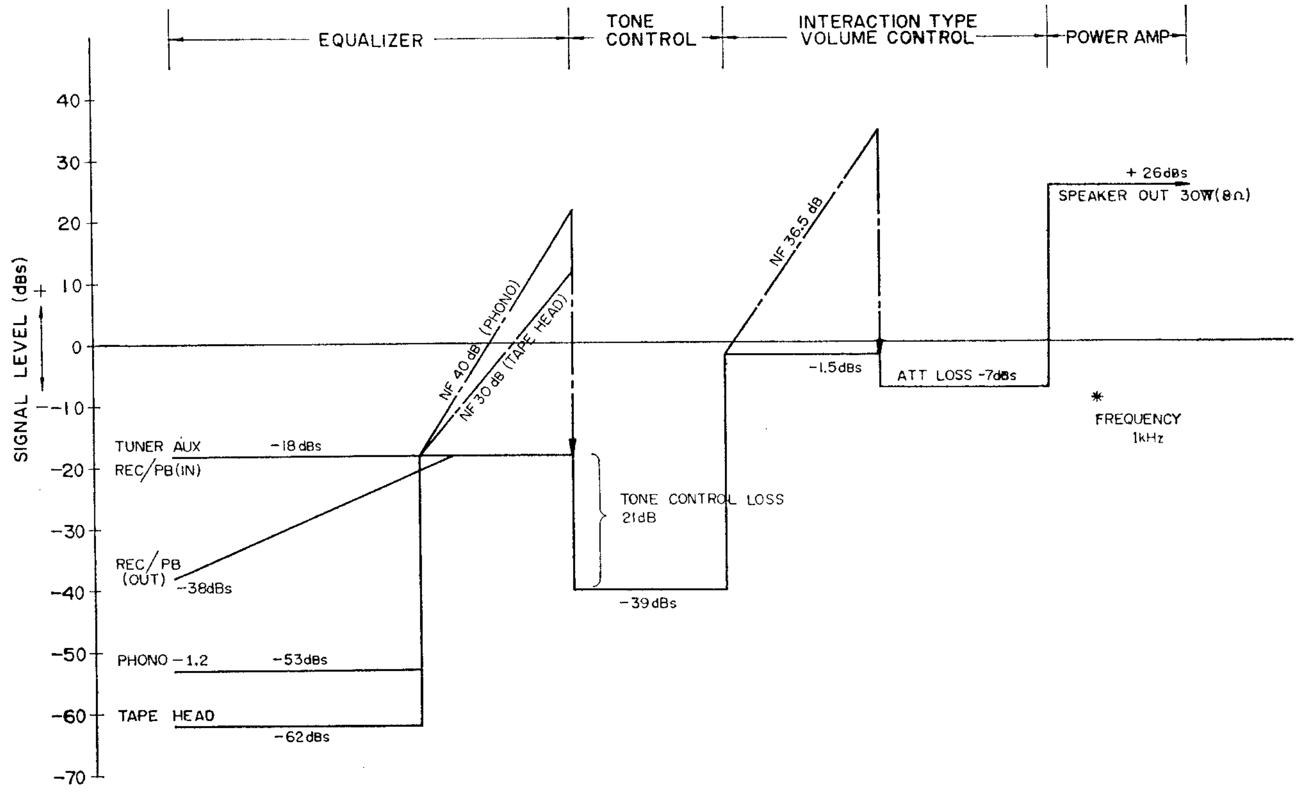
AC outlet: Switched 2, unswitched 1
300W in total

Tone control: Bass ±10 db at 100 Hz
Treble ±10 db at 10 KHz

TA-1080 BLOCK DIAGRAM


TAPE HEAD
PHONO-1
PHONO-2
TUNER
AUX
TAPE
REC OUT
REC/PB
RIGHT
CHANNEL
LEVEL ADJUST
3-TR EQUALIZER
RIAA, NAB
S1
S2
S3
S4
S5
1-TR EMITTER FOLLOWER
Tone Control
ON
OFF
BALANCE CONTROL
2-TR AMP
Twin T Filter
6-TR POWER AMP
SPEAKER OUT
VOLUME CONTROL
JUMPER
MUTING RELAY
S1 : FUNCTION SELECTOR SWITCH
① TAPE HEAD
② PHONO-2
③ AUX
S2 : FUNCTION SELECTOR SWITCH
① TUNER
② PRESET POSITION OF S1
③ PHONO-1
S3 : TAPE MONITOR SWITCH
① SOURCE
② TAPE
S4 : MODE SELECTOR
S5 : TONE CONTROL CANCEL SWITCH

TA-1080 LEVEL DIAGRAM



Warm-up Time for TA-1080

Integrated Stereo Amplifier TA—1080 which has been in stock or not used for a long time, it takes several minutes to start operation after Power Switch is set on for the first time. It is due to Electrolytic Capacitor in Muting Relay Circuit which serves to give proper time-lag (usually 6〜7 seconds) to the Amplifier.

When Electrolytic Capacitor is left unused, leakage current value increases and it takes much more time than usual for Electrolytic Capacitor to charge up to normal voltage.

It gives no affect to the natural performance of Amplifier itself.

Upon the reports so far received and the result of investigation, attention should be paid to the following points.

1. It does not engender excessive time-lag to leave the unit unused for about one month.
2. It takes 2 or 3 minutes at longest to start operation, however only one set took 10 minutes in very rare case.

We hope you will take this phenomena in throughly especially when you set Power Switch on in customer's presence for the first time.

Notes : To simplify the discussions only channel "1" is described. Channel "2" is identical.

Method of disassembling the set

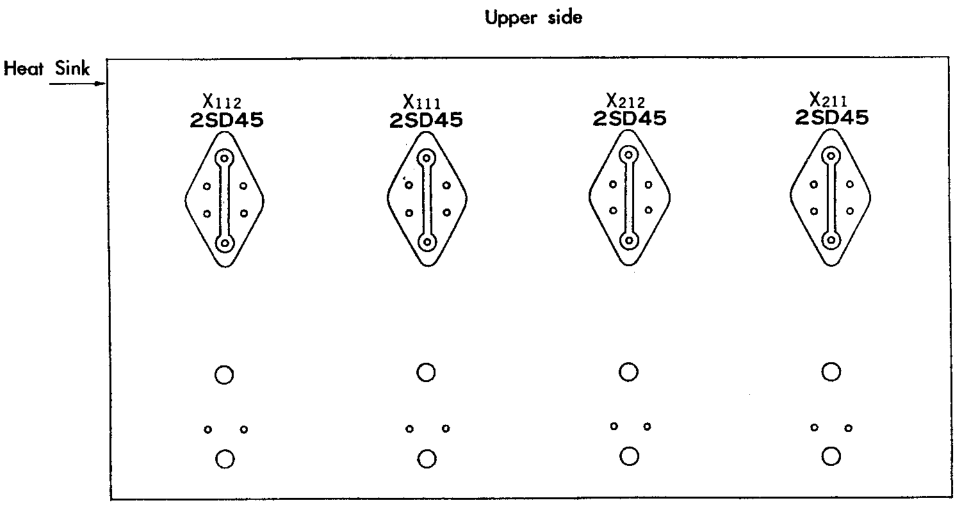
(1) Removal of power amplifier and power supply section.

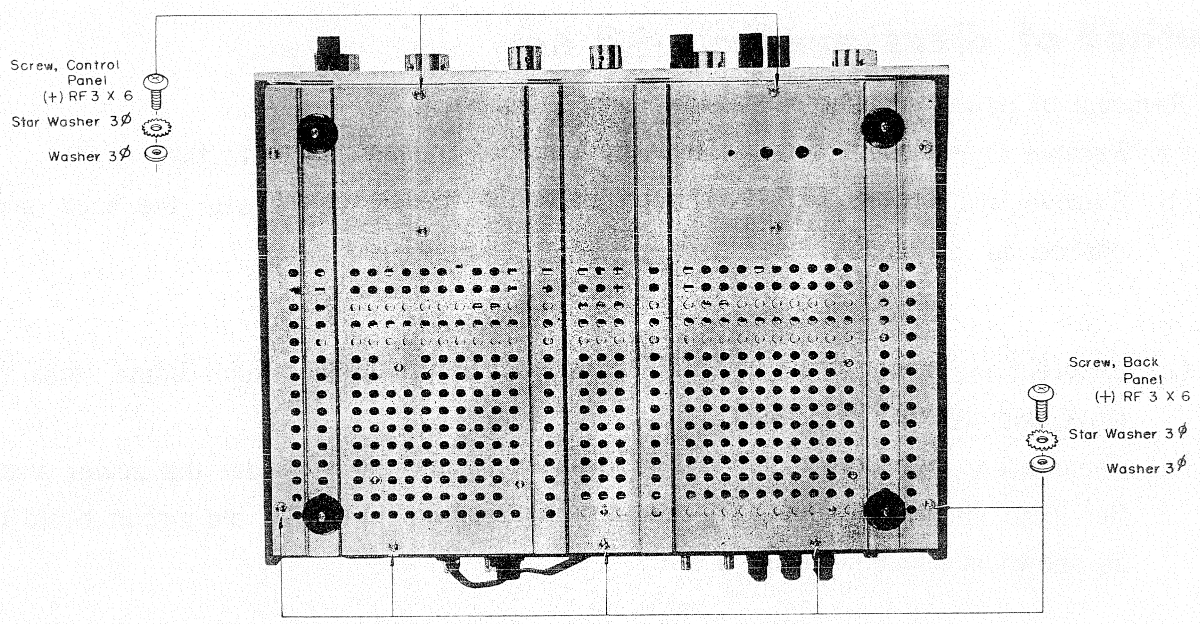
- (a) Remove four machine screws from both side of chassis cover to take it off.
- (b) Remove five screws (RF3×6) from bottom of chassis to release the back panel section as in Fig. 1.
- (c) Unsolder the mylar capacitor C310 (0.01μF) from muting circuit board, then remove two screws (RF3×8)
- (d) Remove the five screws (RF4×10) from heat sink and unsolder the power amplifier input shield wire, now you can turn that section to make the circuit board up as shown in Fig. 2 and Fig. 3.

(2) Removal of preamplifier section and control panel.

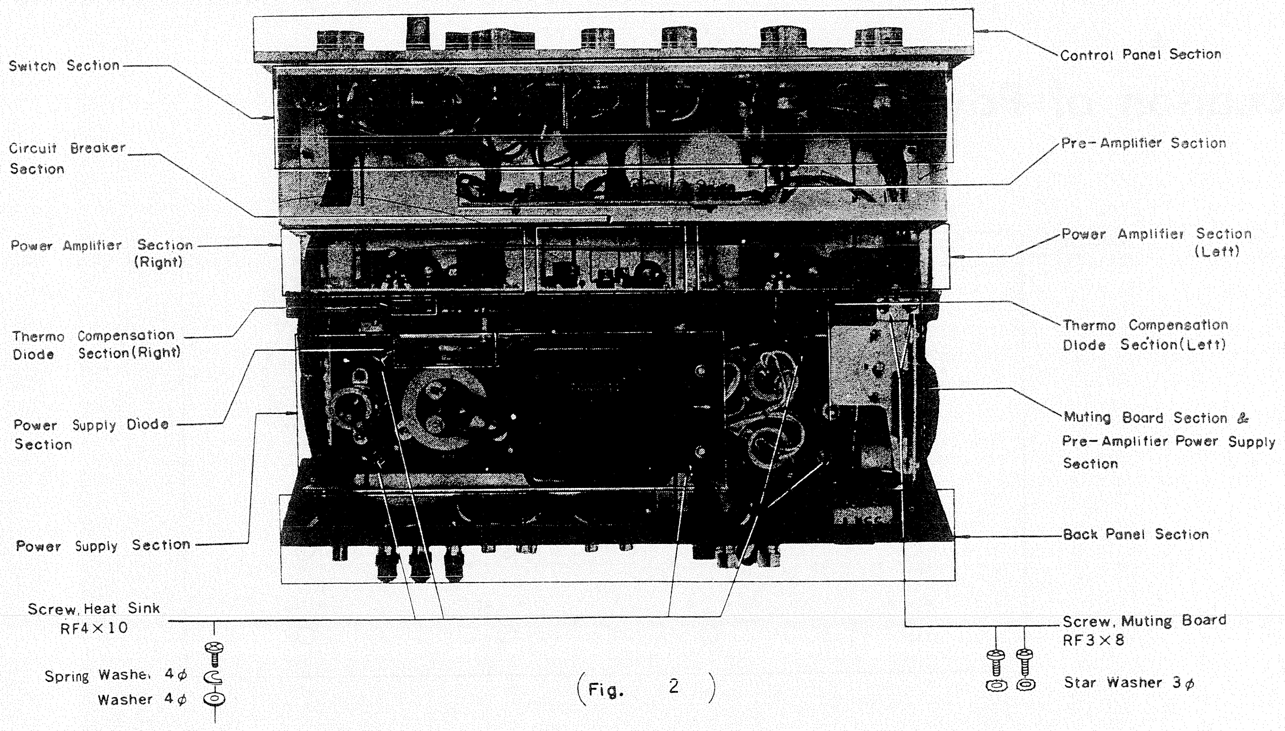
- (a) After taking off the chassis cover, remove the two screws (RF3×6) from front side of bottom plate as shown in Fig. 1.
- (b) Remove the four screws (RF3×6) from both side of the chassis as shown in Fig. 3. and control panel will come free.
- (c) The service will be easily done after following above procedures as shown in Fig. 4.

Location of Power Transistor

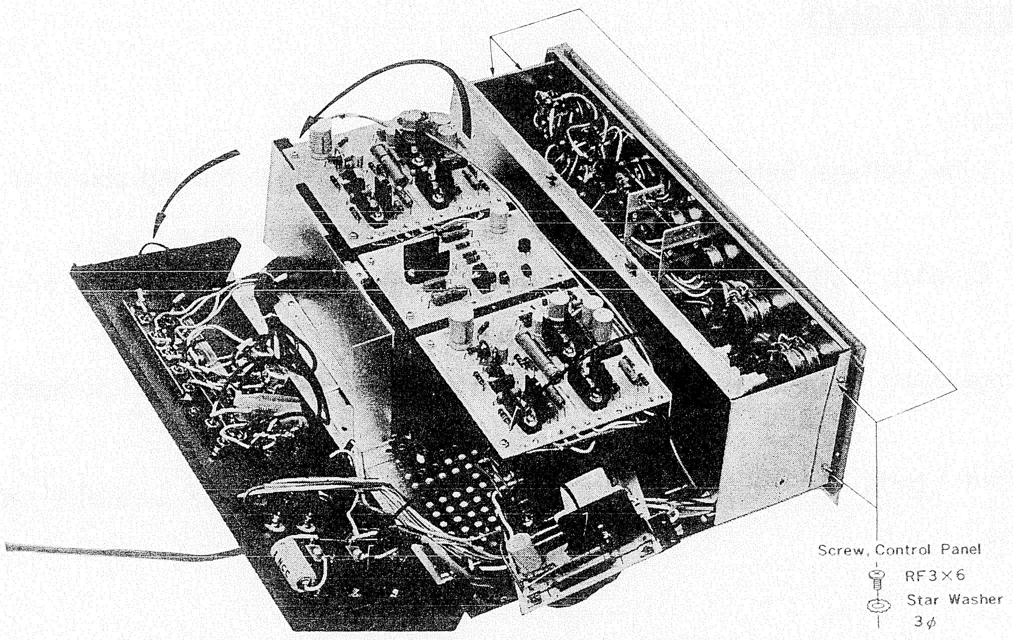



Screw, Control Panel (+) RF 3 X 6
Star Washer 3∅
Washer 3∅
Screw, Back Panel (+) RF 3 X 6
Star Washer 3∅
Washer 3∅

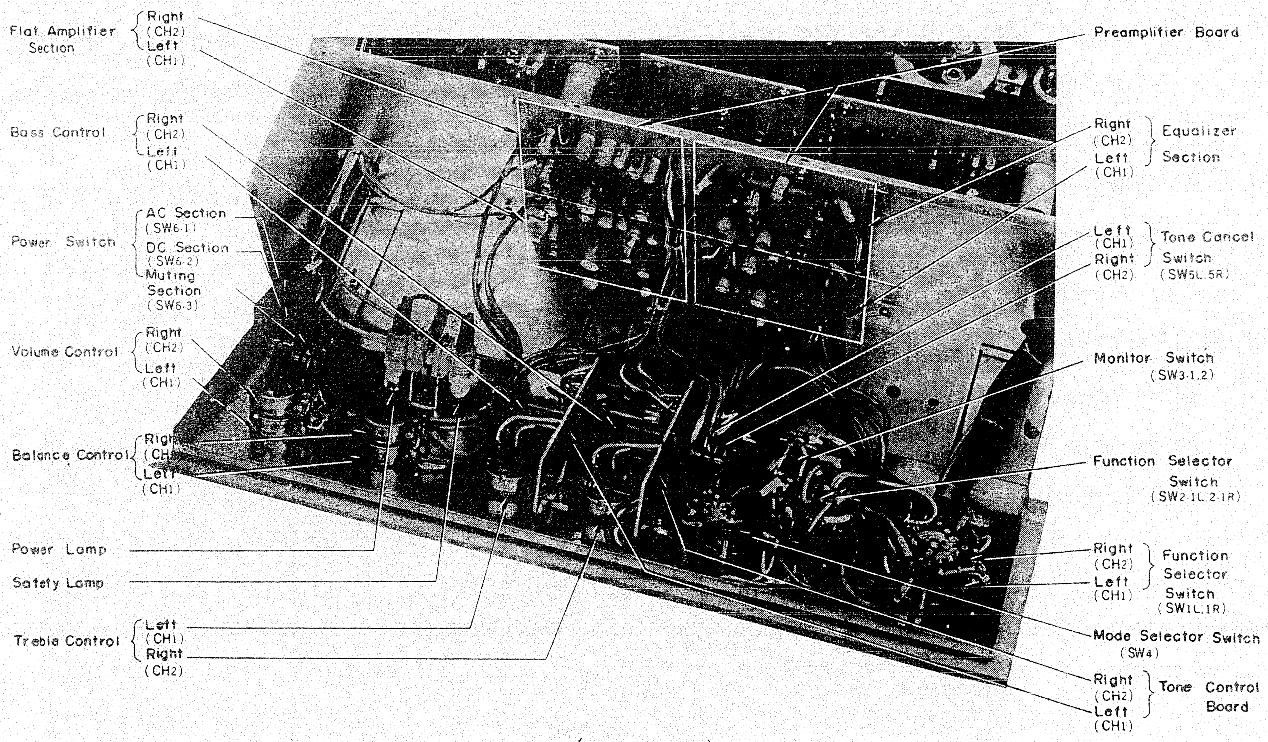
(Fig. 1)


Switch Section
Circuit Breaker Section
Power Amplifier Section (Right)
Thermo Compensation Diode Section(Right)
Power Supply Diode Section
Power Supply Section
Screw, Heat Sink RF4×10
Spring Washe, 4∅
Washer 4∅
Control Panel Section
Pre-Amplifier Section
Power Amplifier Section (Left)
Thermo Compensation Diode Section(Left)
Muting Board Section & Pre-Amplifier Power Supply Section
Back Panel Section
Screw, Muting Board RF3×8
Star Washer 3∅

(Fig. 2)


Screw, Control Panel
RF3×6
Star Washer
3φ

(Fig. 3)


Flat Amplifier Section
Right (CH2)
Left (CH1)
Bass Control
Right (CH2)
Left (CH1)
Power Switch
AC Section (SW6-1)
DC Section (SW6-2)
Muting Section (SW6-3)
Volume Control
Right (CH2)
Left (CH1)
Balance Control
Right (CH2)
Left (CH1)
Power Lamp
Safety Lamp
Treble Control
Left (CH1)
Right (CH2)
Preamplifier Board
Right (CH2)
Left (CH1)
Equalizer Section
Left (CH1)
Right (CH2)
Tone Cancel Switch (SW5L.5R)
Monitor Switch (SW3-1,2)
Function Selector Switch (SW2-1L.2-1R)
Right (CH2)
Left (CH1)
Function Selector Switch (SW1L.1R)
Mode Selector Switch (SW4)
Right (CH2)
Left (CH1)
Tone Control Board

(Fig. 4)

ADJUSTMENT

Preparation

* AC Line Voltage Selector Plug ;	Insert the plug so that the top arrow of the plug points to the proper voltage.
* AC Balance Control ;	Turn adjustable resistor (R163), (R263) clockwise to the full.
* Temperature Compensation Diode ;	Check the Diodes being attached to heat sink. (Main Amplifier)
* Output Load ;	Connect an 8 ohms resistor instead of speaker.
* Fuse ;	Insert a 5A fuse.

(A) Circuit Breaker Block Adjustment

Please make it a rule to adjust the circuit breaker block before fix it to the chassis.

1) Turn the adjustable resistor 200 ohms, (R309), counterclockwise to the full.

2) Feed DC. 3.5V between Diode D303 or D304 and earth. Then make the power switch on.

Confirm the voltage between +B line and earth is nearly 85V.

3) Connect the voltmeter between +B line of the first stage of Main Amplifer and earth. Turn the adjustable resistor R309 clockwise and fix it when the voltmeter comes to zero on dial which shows the circuit breaker is operating.

4) Confirm the circuit breaker operates by each signal through diode D303 and D304 respectively.

(B) AC Balance Adjustment of Main Amplifier block.

1) Connect VTVM and Oscilloscope across 8 ohms load resistor.

2) Supply 1 KHz signal to the input terminal (X_{107} or $_{207}$ Base) through attenuator and 50μF capacitor as shown in Fig. 1.

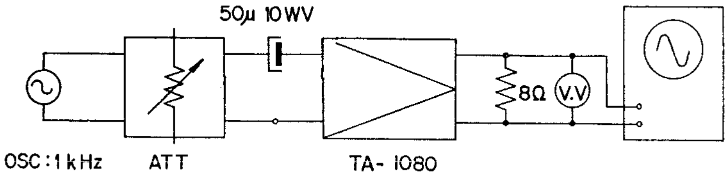


Fig. 1

3) Increase the signal gradually and turn the adjustable resistor (50KΩ, R160, R260) to get the both upper and lower side of wave form are clipped at the same time as shown in Fig. 2.

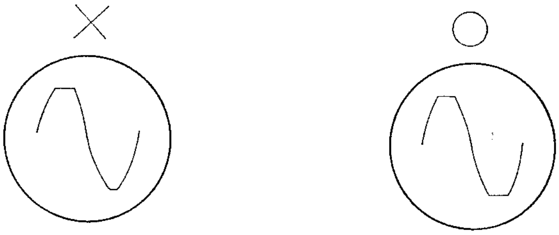


Fig. 2

(C) DC. Balance Adjustment of Main Amplifier block.

1) Connect a VTVM (d-c 0.1V full scale) between R176 (R276) and earth.
2) Decrease the input signal level down to 50dBs by attenuator.
3) Turn the bias adjustment resistor R136 (R236) to obtain 25mV reading on VTVM.

Remarks : Repeat procedure (B), (C) two or three times.

(D) The other Items.

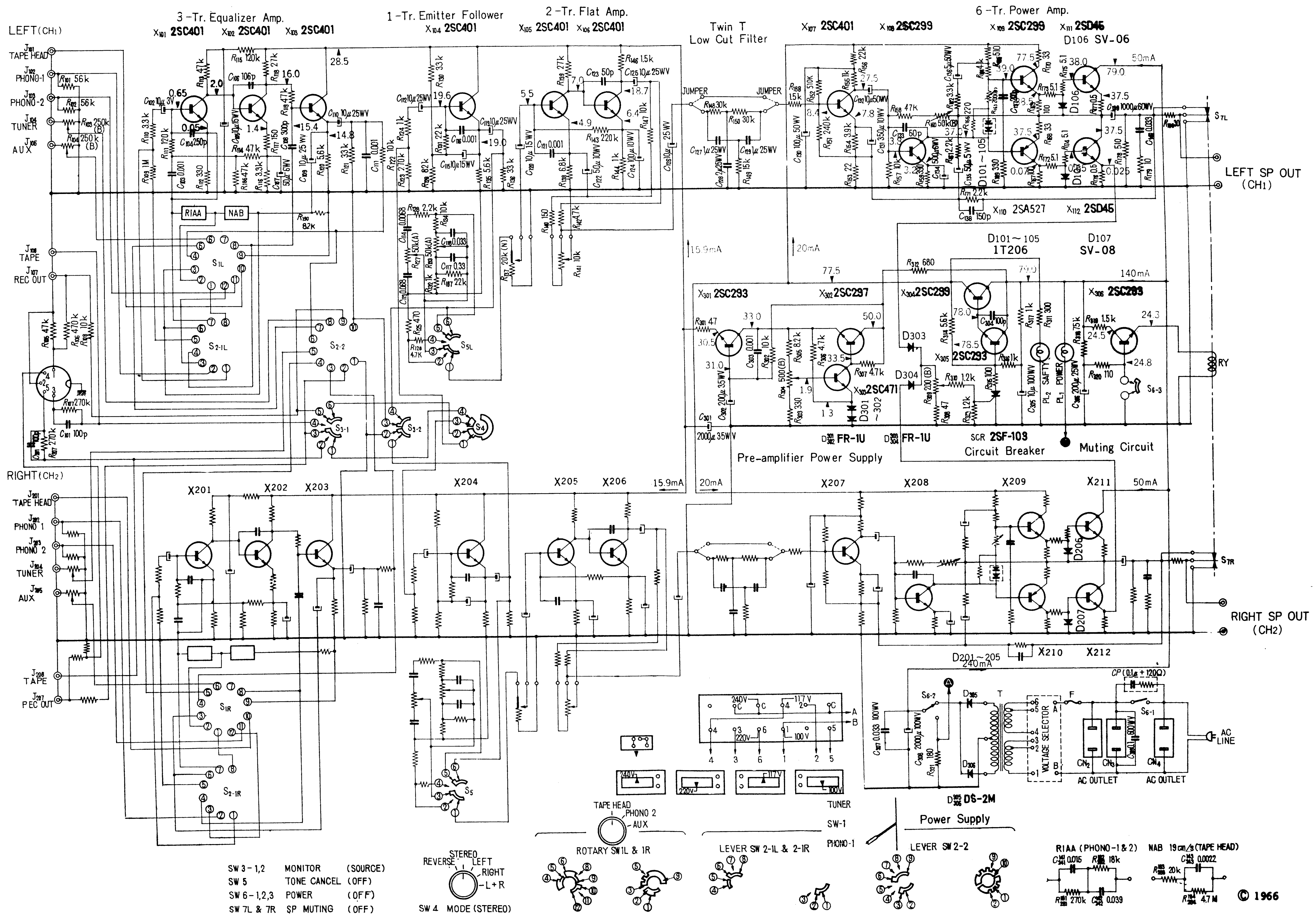
1) Relay operation time will be within 15sec. after power switch turned on at first. Operation time becomes 10~4sec. after switched on and off two or three times. The difference of time between channel "1" and "2" should be less than 10 sec.
2) Phase of both channels must be same.
3) The difference of level between channel 1 and 2 must be less than 2 dB when the input level control is at maximum position.
4) Output level should be decreased to zero by adjusting input level control.
5) When make the short circuit of the speaker output, the circuit breaker must be work perfectly.

TA-1080 TROUBLE SHOOTING CHART

To avoid the transistor damage by accident, please make it a rule to increase the input AC line voltage gradually by variable transformer, while checking the total current of preamplifier or power amplifier respectively.

SYMPTOM	TROUBLE	REMEDY
POWER SUPPLY		
Power lamp fails to light and no sound	No AC line voltage	Trace the line failure
	Defective fuse	Replace fuse
	Defective power transformer	Replace transformer
Fuse "F" blows as AC Power switch turned on	Shorted AC line cable on the primaly side of the powertransformer	Repair the short circuit or replace
	Defective filter capacitors	Check C308, C307, replace if bad
	Short +B line	Trace the line failure
	Defective power transformer	Replace transformer
MUTING CIRCUIT		
Click sound is heard as power switch turned on	Muting relay fails to work	Ceck relay "RY", X306, switch "S6-3"
Sound itermittent	Defective relay contact point	Repair or replace
No sound	Defective C, R, components	Check R318(75K), C306($200\mu F$) replace if bad
CIRCUIT BREAKER		
Safety lamp fails to light, no sound	Speaker output short	Repair the short circuit
	Thermal run away of power transistors	Check no signal DC bias current, (50mA), of power transistor * See power Amp.
	Defective SCR	Check 2SF-103, replace if bad
	Defective R316	Check. Replace if necessary
	Defective X304, X305	Check. Replace if necessary
POWER AMPLIFIER		
Safety lamp fails to light, no sound Heat sink becomes abnormally hot	Thermal run away of power transistor	Check no signal DC bias current of power transistor X111, X112, (50mA) X109, X110, and X304 Replace if bad
*If thermal run away accident occured, all power transistors (X111, X112, X109 and X110) should be checked whether it is good or not. Caution: In checking the forward and reverse resistance between each lead (Emitter, Base, and Collector) of power transistor by VOM, be sure using low range of ohm meter. *AC and DC balance adjustment should be done, after replacing the power transistors.		
POWER AMPLIFIER		
No sound	Defective transistor	Check X109, X110 Replace if necessary
Too much hum	Defective filter capacitor	Check C308, C309

TA-1080 SCHEMATIC DIAGRAM


LEFT (CH1)
TAPE HEAD
PHONO-1
PHONO-2
TUNER
AUX
TAPE
REC OUT
3-Tr. Equalizer Amp.
X101 2SC401 X102 2SC401 X103 2SC401
1-Tr. Emitter Follower
X104 2SC401
2-Tr. Flat Amp.
X105 2SC401 X106 2SC401
Twin T
Low Cut Filter
JUMPER
X107 2SC401 X108 2SC299
6-Tr. Power Amp.
X109 2SC299 X111 2SD45
D106 SV-06
X110 2SA527 X112 2SD45
LEFT SP OUT
(CH1)
S7L
RIAA
NAB
S1L
S2-1L
S2-2
S3-1
S3-2
S4
S5L
D101~105
1T206
D107
SV-08
X301 2SC293
X302 2SC297
X304 2SC299
X305 2SC293
X303 2SC471
X306 2SC293
D303
D304
D301~302
RY
S6-3
SAFTY
POWER
PL2
PL1
D303 D304 FR-1U
D301 D302 FR-1U
SCR 2SF-103
Circuit Breaker
Muting Circuit
Pre-amplifier Power Supply
15.9mA
20mA
77.5
140mA
50mA
RIGHT (CH2)
TAPE HEAD
PHONO 1
PHONO 2
TUNER
AUX
TAPE
PEC OUT
X201 X202 X203 X204 X205 X206
X207 X208 X209 X211
X210 X212
D206
D207
S7R
RIGHT SP OUT
(CH2)
D201~205
240mA
S1R
S2-1R
S5
S6-2
S6-1
D305
D306
T
VOLTAGE SELECTOR
F
CP (0.1μ + 120Ω)
CN1 CN2 CN3 CN4
AC OUTLET
AC OUTLET
AC LINE
D305 D306 DS-2M
Power Supply
240V 117V 220V 100V
A
B
TAPE HEAD
PHONO 2
AUX
TUNER
SW-1
PHONO-1
ROTARY SW1L & 1R
LEVER SW 2-1L & 2-1R
LEVER SW 2-2
STEREO
REVERSE
LEFT
RIGHT
L+R
SW 4 MODE (STEREO)
SW 3-1,2 MONITOR (SOURCE)
SW 5 TONE CANCEL (OFF)
SW 6-1,2,3 POWER (OFF)
SW 7L & 7R SP MUTING (OFF)
RIAA (PHONO-1 & 2)
NAB 19cm/s (TAPE HEAD)

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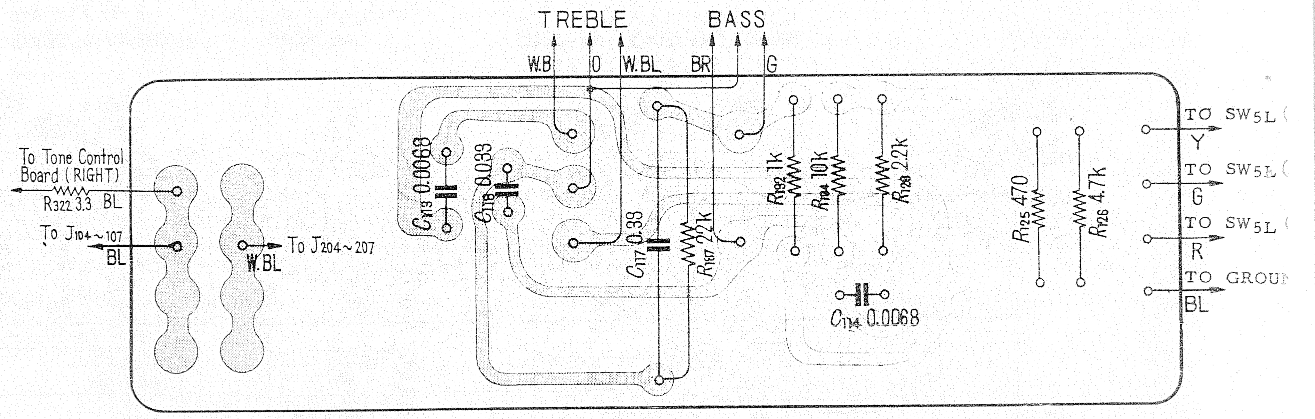
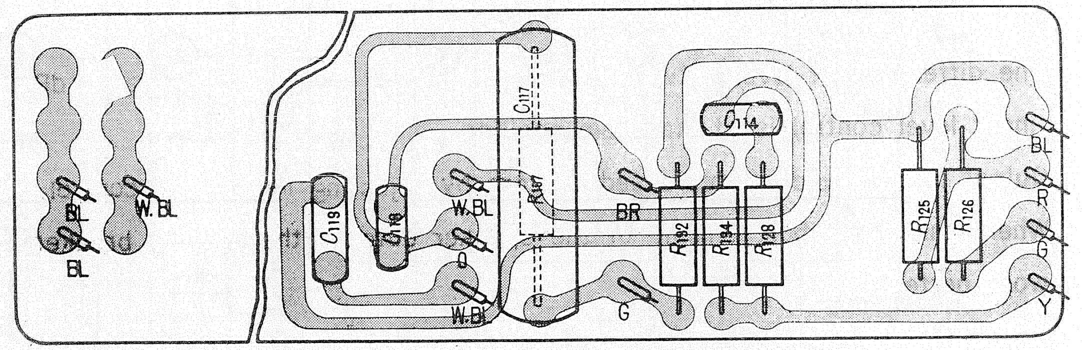
SYMPTOM	TROUBLE	REMEDY
POWER AMPLIFIER		
Noise is heard even volume control set at minimum position	Defective transistor	Check X107, X108, X109, X110 Replace the defective transistor
Sound distorted	One of X109-110 defective	Replace the defective transistor
* To find out the defective part of amplifier, signal injector or audio signal generator is useful going through each stage one by one.		
REGULATED POWER SUPPLY		
Power amplifier works but preamplifier dose not work.	No DC input voltage	Check the +B line
	Transistor defective	Check X301, X302, X303 Replace if bad
	Defective filter capacitor C301 (200μF)	Replace
Excessive high DC output	FR-1U (D301, D302)	Replace
Oscillation in power supply	Defective X302	Replace
INTERACTION TYPE VOLUME CONTROL CIRCUIT (FLAT AMPLIFIER)		
No sound or intermittent sound	Defective transistor	Check X105, X106
Defective volume control	Defective potentiometer R141 (10K)	Replace
Noise is heard at volume control full, balance control minimum	Coupling capacitor leak	Check C125, C126, C120 Replace if bad
	Defective transistor	Check X105, X106
EMITTER FOLLOWER		
Hash noise is heard at volume control set maximum position, but stops when input terminal shorted	Defective transistor or coupling capacitor	Check X104, C119 Replace if bad
	Defective X104	Replace
3-TR EQUALIZING AMPLIFIER		
No sound or hash noise is heard even input terminal shorted, at volume control set maximum position	Defective transistor	Check X101, X102, X103 Replace if bad
MODE SWITCH		
Large click sound is heard as turning the mode switch Phono 1, 2 to Tape head	Defective C109	Replace
Phono 2 to Tape head	Defective S1L, S2L	Repair or replace
Tuner to Aux	Defective C102	Replace
* To simplify the discussions, only channel "1" (left), and its related circuitry was descrived. Channel "2" (Right) is identical except tor reference symbol numbers.		

TONE CONTROL BOARD

—Conductor Side—

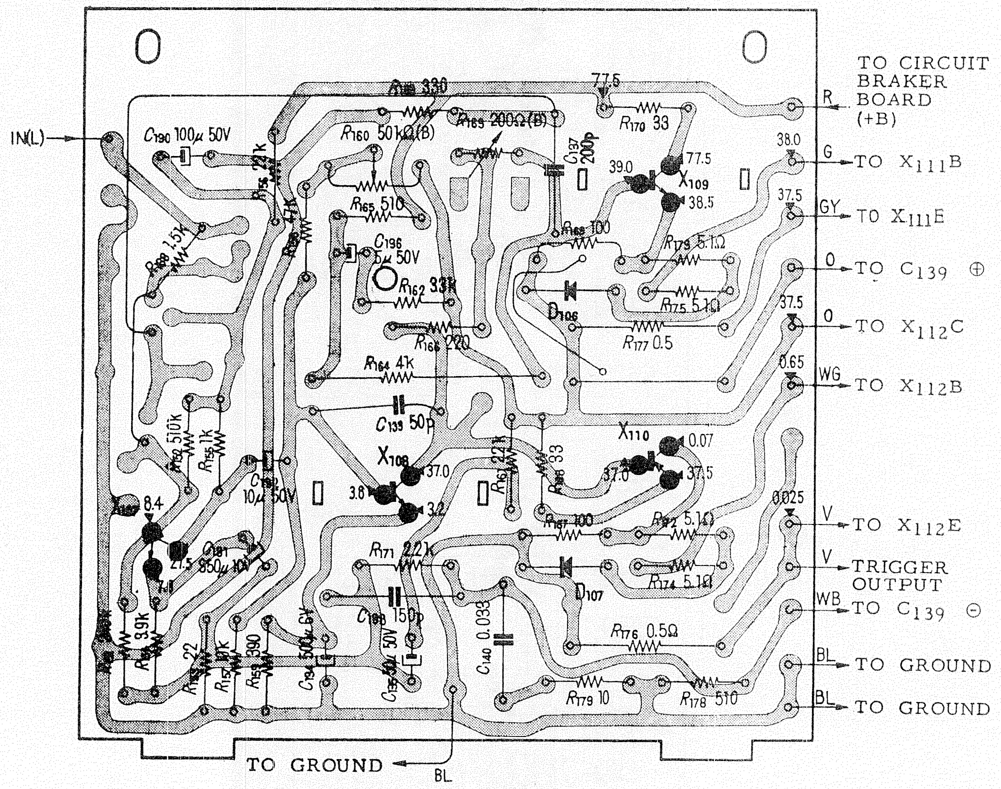

TREBLE
BASS
W.B
O
W.BL
BR
G
To Tone Control Board (RIGHT)
R322 3.3 BL
To J104~107
BL
W.BL
To J204~207
C113 0.0068
C118 0.033
C117 0.33
R187 22K
R192 1K
R194 10K
R128 2.2K
C114 0.0068
R125 470
R126 4.7K
TO SW5L
Y
TO SW5L
G
TO SW5L
R
TO GROU
BL

—Component Side—

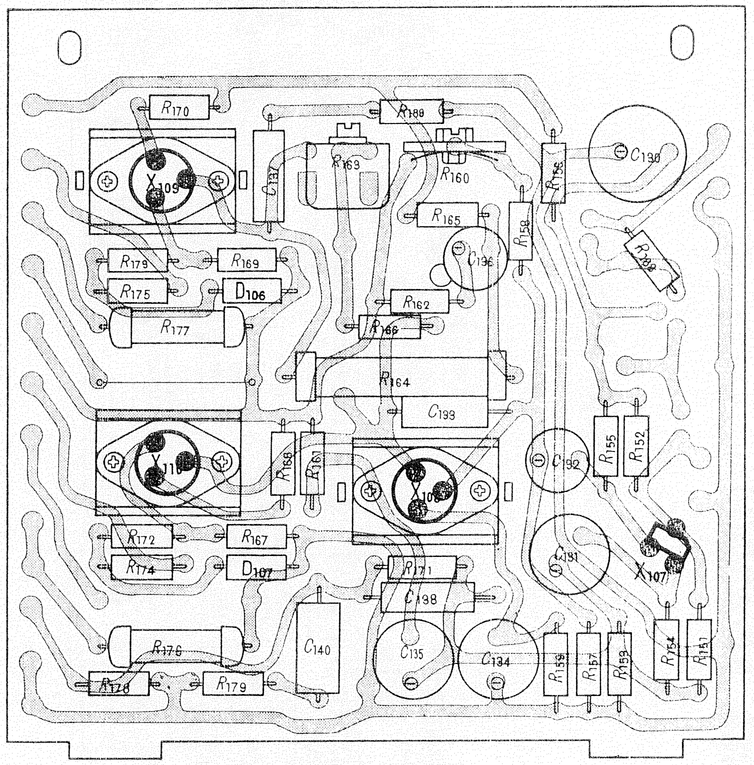

BL
BL
W.BL
C119
C118
W.BL
O
W.BL
C117
R187
C114
BR
R192
R194
R128
G
R125
R126
BL
R
G
Y

POWER AMPLIFIER BOARD

—Conductor Side—

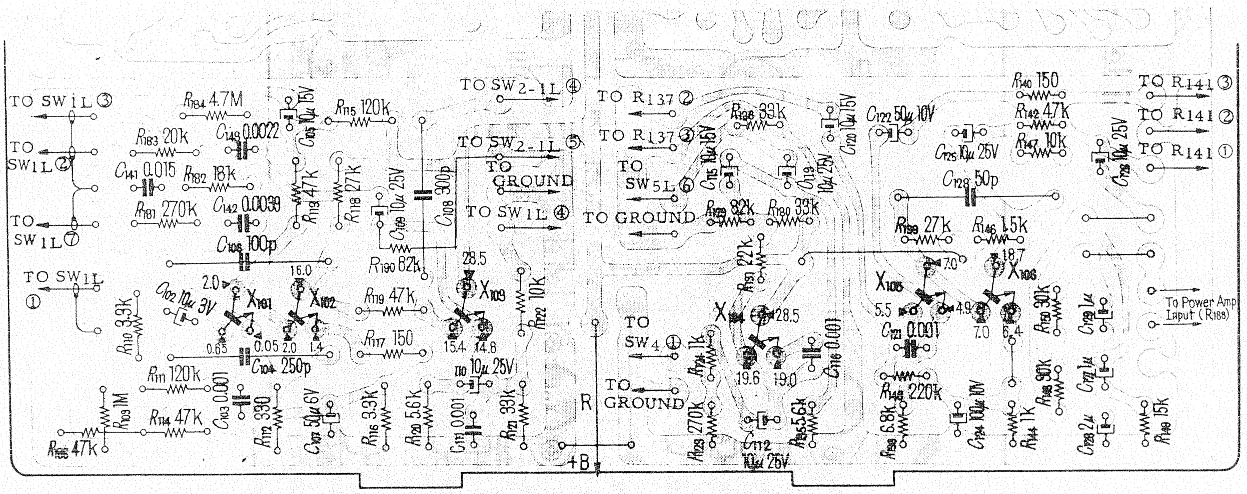

IN(L)
C190 100μ 50V
R156 22K
R188 330
R160 50KΩ(B)
R163 200Ω(B)
77.5
R170 33
C137 200p
R186 4.7K
R165 510
C196 5μ 50V
R162 33K
R166 220
R164 4K
C139 50p
R168 1.5K
R152 510K
R155 1K
C192 10μ 50V
X107 8.4
21.5
7.4
C191 350μ 10V
X108
37.0
3.8
3.2
R161 22K
R168 33
X109
39.0
77.5
38.5
R168 100
R173 5.1Ω
R175 5.1Ω
D106
R177 0.5
X110
0.07
37.0
37.5
R167 100
R172 5.1Ω
D107
R174 5.1Ω
R171 2.2K
C198 150p
C135 50μ 50V
C140 0.033
R176 0.5Ω
R179 10
R178 510
R154 3.9K
22
R153
R157 10K
R159 390
C134 500μ 6V
38.0
37.5
37.5
0.65
0.025
R
G
GY
O
O
WG
V
V
WB
BL
BL
TO CIRCUIT BRAKER BOARD (+B)
TO X111B
TO X111E
TO C139 ⊕
TO X112C
TO X112B
TO X112E
TRIGGER OUTPUT
TO C139 ⊖
TO GROUND
TO GROUND
TO GROUND
BL

—Components Side—

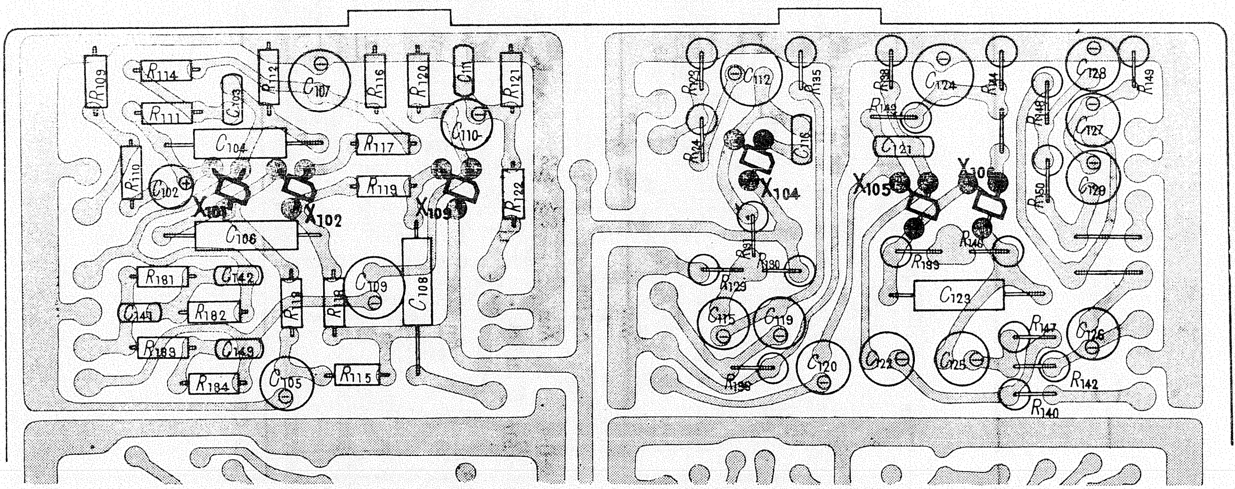

R170
X109
C137
R163
R188
R160
R156
C190
R165
R158
C196
R188
R179
R169
R175
D106
R177
R162
R166
R164
C133
X110
R168
R161
X108
C192
R155
R152
R172
R167
R174
D107
R171
C138
C191
X107
R176
C140
C135
C134
R159
R157
R153
R154
R151
R178
R179

PRE-AMPLIFIER BOARD(L)

—Conductor Side—

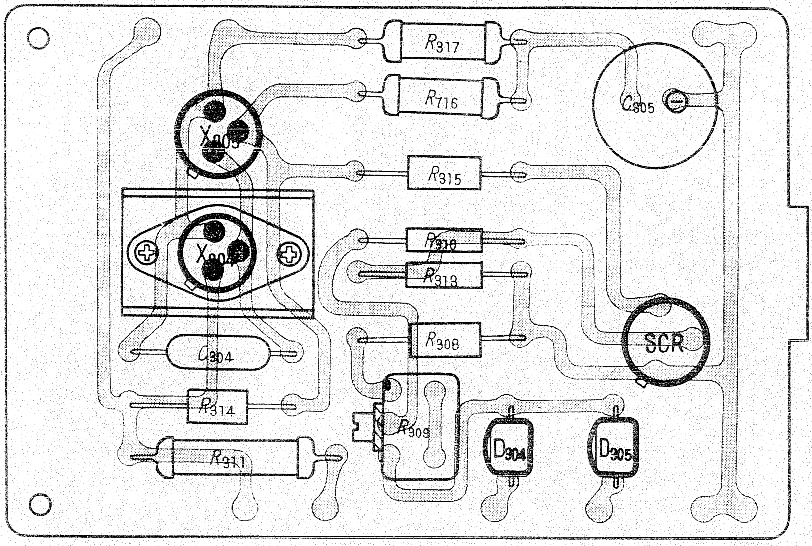

TO SW1L ③
TO SW1L ②
TO SW1L ⑦
TO SW1L ①
TO SW2-1L ④
TO SW2-1L ⑤
TO GROUND
TO SW1L ④
TO R137 ②
TO R137 ③
TO SW5L ⑥
TO GROUND
TO SW4 ①
TO GROUND
TO R141 ③
TO R141 ②
TO R141 ①
To Power Amp Input (R188)
+B
R
R184 4.7M
R183 20k
C148 0.0022
C141 0.015
R182 18k
R181 270k
C142 0.0039
C106 100p
R115 120k
C105 10μ 15V
R113 47k
R118 27k
C109 10μ 25V
C108 300p
R190 82k
X101
X102
X103
C102 10μ 3V
R110 3.3k
R111 120k
C104 250p
R119 47k
R117 150
R122 10K
C110 10μ 25V
R103 1M
R114 47K
R155 47K
C103 0.001
R112 330
C107 50μ 6V
R116 3.3K
R120 5.6K
C111 0.001
R121 33k
R136 33k
C115 10μ 15V
C119 10μ 25V
C120 10μ 15V
R129 82k
R130 33K
R131 22k
X104
C116 0.001
R124 1k
R123 270k
C112 10μ 25V
R135 5.6k
C122 50μ 10V
C125 10μ 25V
C123 50p
R140 150
R142 47k
R147 10k
C126 10μ 25V
R199 27k
R146 1.5k
X105
X106
C121 0.001
R148 220k
R198 6.8K
C124 10μ 10V
R144 1K
R150 30K
R189 30K
C129 1μ
C127 1μ
C128 2.2μ
R149 15K
2.0
16.0
0.65
0.05
2.0
1.4
28.5
15.4
14.8
28.5
19.6
19.0
7.0
18.7
5.5
4.9
7.0
6.4

— Components Side —

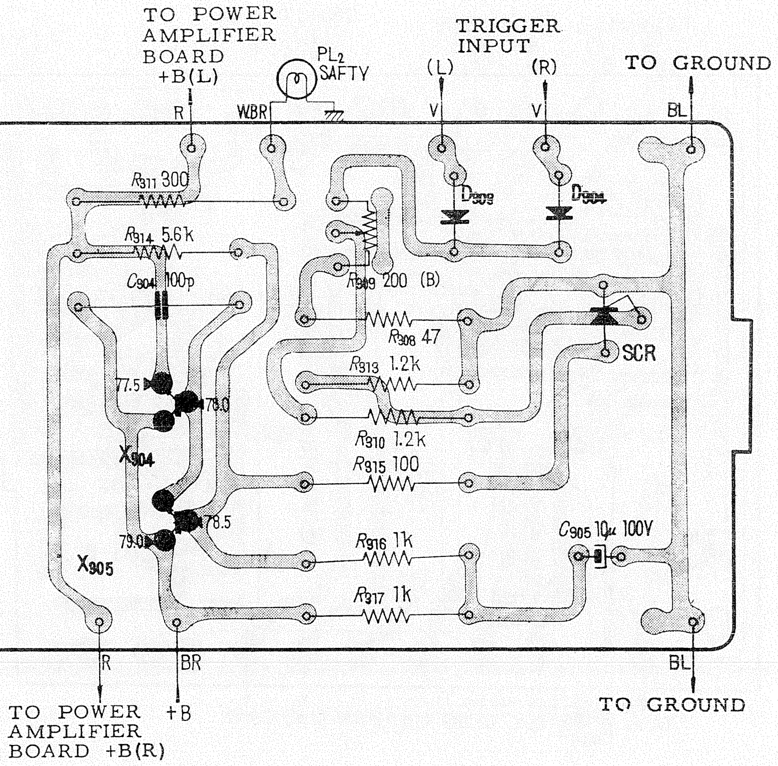

R109
R114
R111
C103
R112
C107
R116
R120
C111
R121
C110
C104
R117
R110
C102
X101
X102
R119
X109
R122
C106
R181
C142
C141
R182
R113
R118
C109
C108
R183
C148
R184
C105
R115
R123
C112
R135
R124
C116
X104
R131
R130
R129
C115
C119
C120
R136
R198
C124
R144
R149
C121
X105
X106
R150
R148
R199
C123
R147
C122
C125
C126
R142
R140
C128
R149
C127
C129

CIRCUIT BREAKER BOARD

— Components Side —

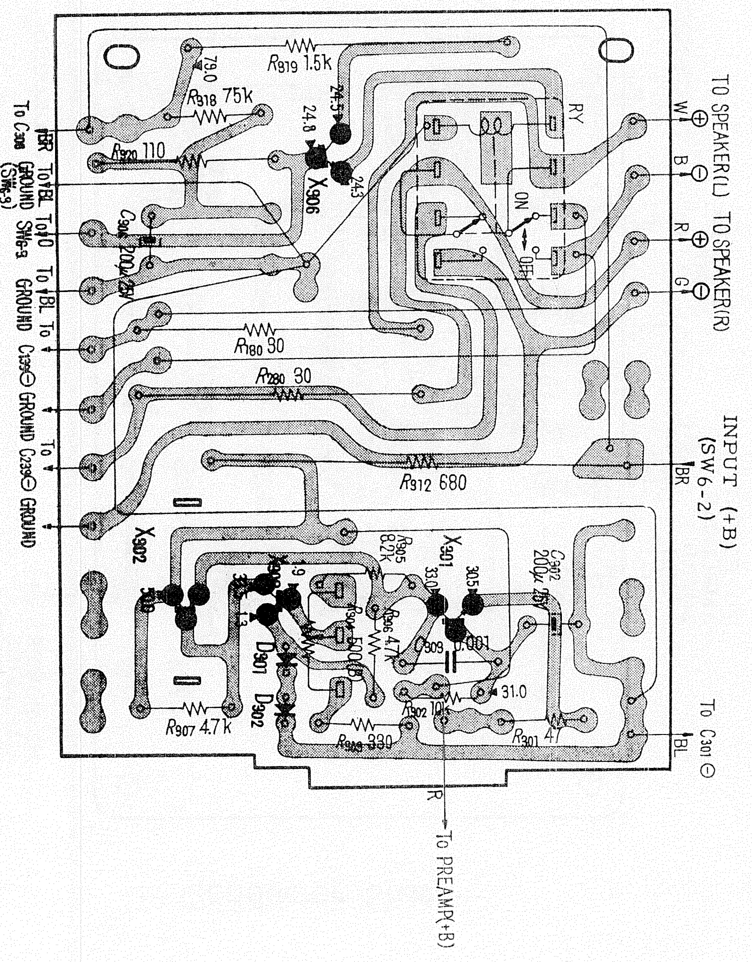

R317
R716
C305
X305
R315
R310
R313
X304
R308
SCR
C304
R314
R309
D304
D305
R311

— Conductor Side —

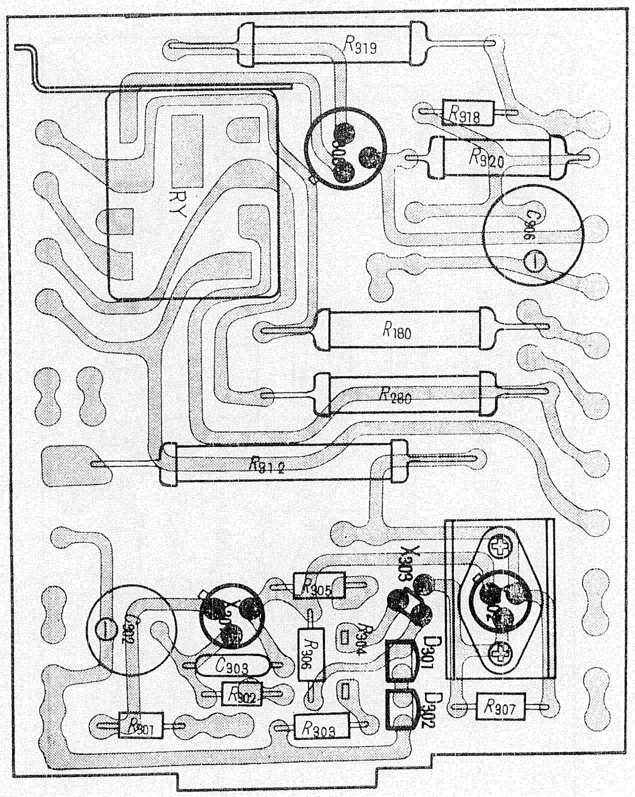

TO POWER AMPLIFIER BOARD +B(L)
PL2 SAFTY
TRIGGER INPUT
(L)
(R)
TO GROUND
R
WBR
V
V
BL
R311 300
R314 5.6k
C304 100p
R309 200 (B)
D303
D304
R308 47
R313 1.2k
SCR
77.5
78.0
X304
R310 1.2k
R315 100
78.5
79.0
X305
R316 1k
C305 10μ 100V
R317 1k
R
BR
BL
TO POWER AMPLIFIER BOARD +B(R)
+B
TO GROUND

MUTING BOARD

—Conductor Side—

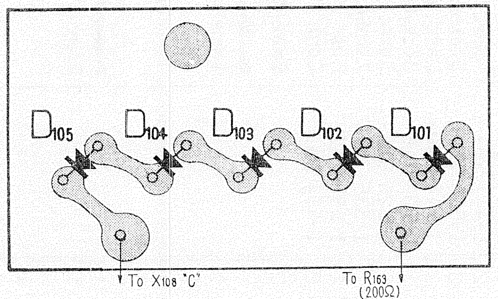

TO SPEAKER(L)
TO SPEAKER(R)
W ⊕
B ⊖
R ⊕
G ⊖
INPUT (+B)
(SW6-2)
BR
To C301 ⊖
BL
R
To PREAMP(+B)
RY
ON
OFF
R919 1.5K
R918 75K
79.0
R920 110
24.5
24.8
24.3
X906
C906 200μ 25V
R180 30
R280 30
R912 680
X902
X301
R305 8.2K
C302 200μ 25V
30.5
33.0
R306 4.7K
R304 500(B)
C309
.001
31.0
1.9
X303
D301
D302
R907 4.7K
R903 330
R302 10K
R301 47
BR To C308
To BL GROUND (SW6-3)
To 0 SW6-3
To BL GROUND
To C139⊖
GROUND
To C239⊖
GROUND

—Components Side—

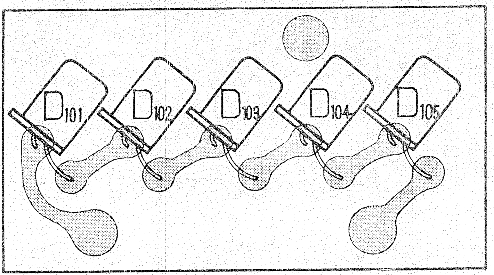

R919
R918
R920
C906
RY
R180
R280
R912
X303
R305
R304
R306
D301
D302
R307
C902
C303
R302
R301
R303

THERMO COMPENSATION DIODE BOARD

—Conductor Side—

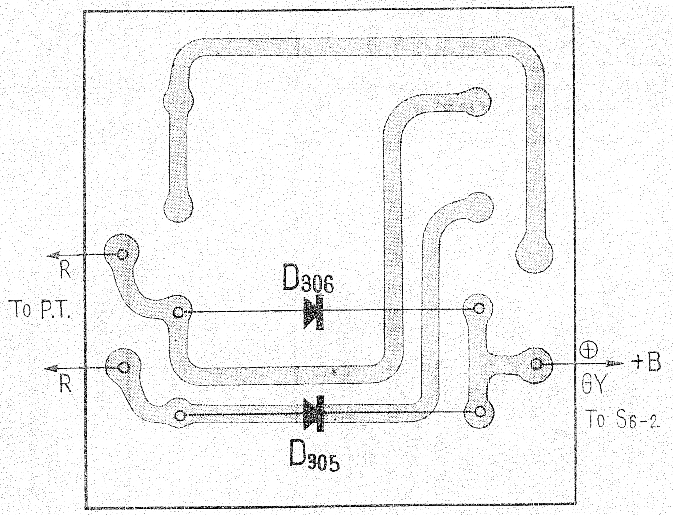

D_{105}
D_{104}
D_{103}
D_{102}
D_{101}
To X_{108} "C"
To R_{163} (200Ω)

—Components Side—

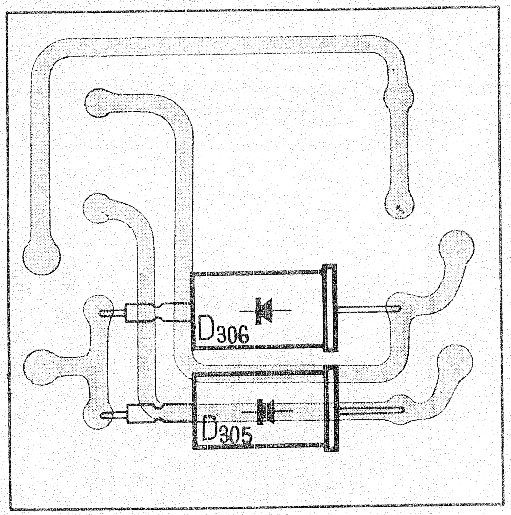

D_{101}
D_{102}
D_{103}
D_{104}
D_{105}

POWER SUPPLY DIODE BOARD

—Conductor Side—


R
To P.T.
R
D_{306}
D_{305}
⊕
+B
GY
To S_{6-2}

—Component Side—



Parts List

Part No.	Description	Q'ty
X-20320-01	Panel Ass'y, control	1
2-032-001-	Panel, control	(1)
2-031-956-	Escutcheon, pilot lamp	(2)
-955-01	Lens, pilot lamp; red	(1)
-955-02	Lens, pilot lamp; green	(1)
X-20320-02-	Panel Ass'y, chassis; front	1
-03-	Knob Ass'y, control; small	4
2-032-004-	Knob, control; small	(1)
7-621-713-48	Screw, set 3×6	(1)
X-20299-02-	Plate Ass'y, chassis; bottom	1
-04-	Knob Ass'y, control; large	4
2-029-911-	Knob, control; large	(1)
7-621-715-40	Screw, set 4×8; control knob	(2)
X-20299-05-	Terminal Ass'y, speaker output; middle type	4
-06-	Chassis Ass'y, power amplifier	1
X-20319-01-	Terminal Ass'y, earth; small type	1
2-032-021-	Panel, back	1
-022-	Label, specification	1
-023-	Plate, printed circuit board	4
2-029-952-	Wire retainer	4
-921-	Cover, cabinet; black	1
-923-	Chassis, pre-amplifier	1
-924-	Plate, relay	1
-925-	Plate, volume control	1
-927-	Plate, hum shield	1
-928-	Heat Sink, 2SC299	8
-930-	Screw, cabinet cover	4
-931-	Knob, power on/off, tone & monitor; dark brown	3
-932-	Knob, function; dark brown	1
-933-	Case Cover, relay; white	1

Part No.	Description	Q'ty
2-029-935-02	Spacer, speaker output; blue	2
-12	Spacer, speaker output; red	2
-936-	Spacer, speaker output; fiber	4
-937-	Plate, phono jack mounting plate reinforcing	2
-938-	Plate, printed circuit board	6
-944-	Cushion styro-foam	2
-945-	Carton	1
-942-	Bracket, wire retainer	1
-943-	Cushion	1
-949-	Felt, vibration absorber; white	1
-950-	Spacer t=0.5	1
-951-	Plate, nut	1
0-051-263-	Foot, rubber	4
3-002-408-05	Spacer 6φ	2
-408-15	Spacer 6φ	2
3-413-100-	Bag, polyethylene	1
3-410-032-	Stopper, cord	1
3-701-030-	Label, serial No.	1
2-029-953-	Label, voltage	1
3-790-706-11	Instruction Manual	1
3-793-009-11	Card, inspection	1
1-506-113-11	Plug, phono; black	6
1-506-105-01	Plug, phono; red	7
-02	Plug, phono; black	7
1-532-017-12	Fuse, 5A	1
X-44900-02-	Cloth, polishing	1
2-029-946-	Bag, accessory	1
3-793-042-11	Sheet, check	1
3-701-020-	Bag, polyethylene	1
7-491-001-	Desiccant	1

Part No.	Description	Q'ty
X-20320-54-	Circuit Board pre-amplifier; mounted	1
-55-	power amplifier; mounted	2
-56-	muting; mounted	1
-57-	circuit breaker; mounted	1
-58-	tone control capacitor; mounted	2
-59-	thermo compensation diode; mounted	2
-60-	power supply diode; mounted	1
1-538-383-	pre-amplifier; printed	1
-348-	power amplifier; printed	2
-343-	muting; printed	1
-344-	circuit breaker; printed	1
-382-	tone control capacitor; printed	2
-345-	thermo compensation diode; printed	2
-346-	power supply diode; printed	1
1-515-050-	Relay	1
1-513-299-	Switch, function; rotary S1	1
-295-	〃 , mode; rotary S4	1
-300-	〃 , function; lever action S2	1
-292-	〃 , monitor; lever action S3	1
-291-	〃 , low cut, high cut and cancel; lever action S5	1
-293-	〃 , power on/off; micro S6	1
1-507-163-	Jack, rec. output and monitor; phono J106, 107, 206, 207	1

Part No.	Desctiption	Q'ty
1-507-162-	Jack, tape head, phono 1, phono 2, tuner and auxiliary; phono J101-105, 201-205	1
1-509-029-	Connector, rec./p.b.	1
1-526-165-	Socket, voltage adaptor; special	1
1-441-231-	Transformer, power	1
1-517-021-	Socket, pilot lamp	2
1-518-050-	Lamp, pilot	2
1-509-015-	Socket, AC	3
1-526-502-	Socket, transistor 2SD45	4
1-536-146-	Terminal board, 1L2P	2
1-533-012-	Fuse Post	1
1-534-241-	Cord, AC power	1
	Semi-Conductors	
	Pre-Amplifier Section	
	Transistor 2SC401-5 X104-106, X204-206	6
	2SC401-6 (White Mark) X101-103,201-293	6
	Power Amplifier Section	
	Transistor 2SD45-5,6 X111-112, 211-212	4
	2SA527 X110,210	2
	2SC401-5 X107,207	2

Parts List

Part No.	Description	Q'ty
	Transistor 2SC299-40 X108,208,109,209	4
	Varistor SV-06 D106,206	2
	SV-08 D107,207	2
	Muting Section	
	Transistor 2SC293-40 X301	1
	2SC293-30 X306	1
	2SC297-03 X302	1
	2SC401-5 X303	1
	Diode FR-1U D301,302	2
	Circuit Board Section	
	Transistor 2SC299-30 X304	1
	2SC293-30 X305	1
	Diode 2SF-103	1
	FR-1U D303,304	2
	Thermo Compensation Diode Section	
	Diode 1T206 D101-105 D201-205	10
	Power Supply Diode Section	
	Diode DS-2M D305, 306	2
	Resistors	
	General Items	
1-221-773-	Potentiometer, dual; 10K ohms R141,241	1
-716-	gang; 20K ohms (M) 〃 20K ohms (N) R137,237	1
-705-	〃 250K ohms (B) R103,104,203,204	2
-714-	50K ohms (D) R127,133,227,233	4
1-201-597-	Composition, 470K ohms ±10% RC1/2 R106,206	2
-814-	3.3 〃 〃 〃 R322	1
1-201-041-	10K 〃 〃 〃 R108,208	2
-054-	47K 〃 〃 〃 R105,205	2
-598-	270K 〃 〃 〃 R107,207	2
1-203-967-	Carbon (Noiseless) 56K ohms ±5% RD1/4 R101,102,201,202	4
1-205-100-	Enameled 180 ohms 10W R321	1
	Pre-amplifier Section	
1-201-021-	Composition 1K ohms ±10% RC1/2 R124,144,224,244	4
-654-	1.5K 〃 〃 R146,246	2
-089-	4.7K 〃 〃 R142,242	2
-086-	5.6K 〃 〃 R135,235	2
-090-	6.8K 〃 〃 R138,238	2
-496-	15K 〃 〃 R149,249	2
-087-	22K 〃 〃 R131,231	2
-687-	27K 〃 〃 R139,239	2
-663-	30K 〃 〃 R148,150,248,250	4
-049-	33K 〃 〃 R136,130,236,230	4
-591-	82K 〃 〃 R129,229	2
-802-	220K 〃 〃 R143,243	2
-598-	270K 〃 〃 R123,223	2
1-242-653-	Carbon 150 ohms ±5% RD1/4UR R140,240	2
-697-	10K 〃 〃 〃 R147,247	2
1-203-065-	5.6K 〃 ±5% RD1/4L R120,220	2
-069-	10K 〃 〃 〃 R122,222	2
1-203-089-	33K ohms ±5% RD1/4L R121,221	2
-123-	120K 〃 〃 〃 R115,215	2
1-209-904-	150 〃 〃 〃 R117,217	2
-990-	330 〃 〃 〃 R112,212	2
1-203-973-	3.3K 〃 〃 〃 R110,116,210,216	4
1-204-906-	18K 〃 〃 〃 R182,282	2
1-209-907-	20K 〃 〃 〃 R183,283	2
1-203-953-	27K 〃 〃 〃 R118,218	2
-934-	47K 〃 〃 〃 R113,114,158,258,213,214,219,119,186,286	10
-908-	120K 〃 〃 〃 R111,211	2
1-209-910-	270K 〃 〃 〃 R181,281	2
1-203-911-	4.7M 〃 〃 〃 R184,284	2
1-204-910-	1M 〃 〃 〃 R109,209	2
1-204-898-	82K 〃 ±10% 〃 R190,290	2
	Power Amplifier Section	
1-223-010-	Adjustable, wire wound 200 ohms(B) R163,263	2
1-221-334-	Adjustable, 50K ohms (B) R160,260	2
1-201-081-	Composition 220 ohms ±10% RC1/2 R166,266	2
-794-	5.1 〃 〃 〃 R172-175,272-275	8
-094-	10 〃 〃 〃 R179,279	2
-689-	33 〃 〃 〃 R168,268,170,270	4
-100-	100 〃 〃 〃 R167,267,169,269	4
-082-	330 〃 〃 〃 R189,289	2
-472-	390 〃 〃 〃 R159,259	2
-845-	510 〃 〃 〃 R165,265 178,278	4
-021-	1K 〃 〃 〃 R155,255	2
-654-	1.5K 〃 〃 〃 R188,288	2
-084-	3.3K 〃 〃 〃 R162,262	2
-085-	3.9K 〃 〃 〃 R154,254	2
-041-	10K 〃 〃 〃 R157,257	2
-087-	22K 〃 〃 〃 R156,256	2
-843-	240K 〃 〃 〃 R151,251	2
-837-	510K 〃 〃 〃 R152,252	2
1-207-151-	Wire wound 0.5 ohms 1.5W R176,276,177,277	4
1-203-049-	Carbon 2.2K ±5% RD1/4L R161,261,171,271	4
1-209-576-	4K ohms ±5% RD2L R164,264	2
1-203-005-	22 ohms ±5% RD1/4L R153,253	2
	Muting Section	
1-221-427-	Adjustable 500 ohms (B) R304	1
1-201-079-	Composition 47 ohms ±10%RC1/2 R301	1
-082-	Composition 330 ohms ±10% RC1/2 R303	1
-089-	4.7K 〃 〃 〃 R306,307	2
-041-	10K 〃 〃 〃 R302	1
-844-	75K 〃 〃 〃 R318	1
-459-	8.2K 〃 〃 〃 R305	1
1-207-152-	Wire Wound 110 〃 1.5W R320	1
-104-	30 〃 4W R180,280	2
-153-	1.5K 〃 4W R319	1
-154-	680 〃 5W R312	1
	Ciruit Braker Section	
1-201-079-	Composition 47 ohms ±10% RC1/2 R308	1

Part No.	Description	Q'ty
	Composition	
1-201-100-	100 ohms ±10% RC1/2 R315	1
-685-	1.2K 〃 〃 〃 R310,313	2
-086-	5.6K 〃 〃 〃 R314	1
1-223-010-	Adjustable, wire wound 200ohms(B)R309	1
1-207-157-	Wire Wound	
	1K ohm 1.5W R316,317	2
-156-	300 ohms 3W R311	1
	Tone Control Capacitor Section	
1-201-021-	Composition	
	1K ohms ±10% RC1/2 R132,232	2
-304-	2.2K 〃 〃 〃 R128,228	2
-041-	10K 〃 〃 〃 R134,234	2
-087-	22K 〃 〃 〃 R187,287	2
1-242-665-	Carbon	
	470 〃 ±5% RD1/4UR R125,225	2
-689-	4.7K 〃 〃 〃 R126,226	2
	Capacitors	
	General Items	
1-101-534-	Encapsulated Component	
	0.1μF +120 ohms 50WV	1
1-105-067-	Mylar 0.01μF ±10% 50WV	
	C310	1
1-115-045-	Oil Tubular 0.1μF ±20% 600WV	
	C309	1
1-105-879-	Mylar 0.033μF ±20% 100WV	
	C307	1
1-109-002-	Mica 100pF ±10% 1KV	
	C101,201	2
1-121-330-	Electrolytic 1000μF 60WV	
	C139,239	2
-328-	〃 2000μF 35WV C301	1
-331-	〃 2000μF 100WV	1
	C308	1
	Pre-Amplifier Section	
1-105-665-	Mylar	
	0.0022μF ±5% 50WV C143,243	2
-668-	0.0039μF ±5%50WV C142,242	2
-821-	0.001μF ±20% 50WV C103,203,111,	
	211,116,216,	
	121,221	8
-675-	0.015μF ±5% 50WV C141,241	2
1-121-324-	Electrolytic	
	1μF ±20% 25WV C127,227,129,	
	229	4
1-131-029-	Tantalum	
	10μF ±20% 3WV C102,202	2
1-121-325-	Electrolytic	
	2μF 25WV C128,228	2
-192-	10μF 15WV C105,205,115,215	
	120,220	6
-179-	10μF 25WV C109,209,110,210	
	112,212,119219	
	126,226,125,225	12
-128-	50μF 10WV C107,207,122,222	4
-159-	100μF 10WV C124,224	2
1-109-005-	Mica	2
	250pF ±10% C104,204	2
-006-	300pF ±10% C108,208	2
-002-	100pF ±10% C106,206	2
-001-	50pF ±10% C123,223	2
	Power Amplifier Section	
1-105-679-	Mylar	
	0.033μF ±10% C140,240	2
1-121-142-	Electrolytic	
	5μF 50WV C136,236	2
-143-	10μF 50WV C132,232	2
-163-	50μF 50WV C135,235	2
-172-	100μF 50WV C130,230	2
-140-	350μF 10WV C131,231	2
-161-	500μF 6WV C134,234	2
1-109-001-	Mica	
	50pF ±10% C133,233	2
-004-	200pF ±10% C137,237	2
-040-	150pF ±10% C138,238	2
	Muting Section	
1-121-190-	Electrolytic	
	200μF 25WV C306	1
-261-	200μF 35WV C302	1
1-105-661-	Mylar	
	0.001μF ±10% 50WV C303	1
	Circuit Breaker Section	
1-121-126-	Electrolytic	
	10μF 100WV C305	1
1-109-002-	Mica	
	100pF ±10% 1KV C304	1
	Tone Control Capacitor Section	
1-105-671-	Mylar	
	0.0068μF ±10% 50WV C114,214	2
-679-	0.033μF ±10% 50WV C118,218	2
-683-	0.068μF ±10% 50WV C113,213	2
1-113-134-	0.33μF ±10% 35WV C117,217	2

Following parts are added to UL and CSA model respectively

Part No.	Description	Q'ty	Part No.	Description	Q'ty
	UL			**CSA**	
2-032-031-	Label, specification	1	2-032-035-	Label, specification	1
3-422-204-	Label, caution	1	2-029-966-	Label, AC outlet	1
2-029-955-	Label, AC outlet	1	3-407-956-	Label, caution	1
2-032-025-02	Carton for 2sets	1/2	3-790-706-22	Instruction Manual	1
3-790-706-22	Instruction Manual	1	1-534-330-31	Cord, power	1
3-994-399-11	Card, warranty	1			
1-534-330-31	Cord, power	1			
1-513-293-22	Switch, power on/off; micro S6	1			
1-209-866-	Resistor, carbon 1 ohm 1W				
	R176, 177, 276, 277	8			

Sony Corporation

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